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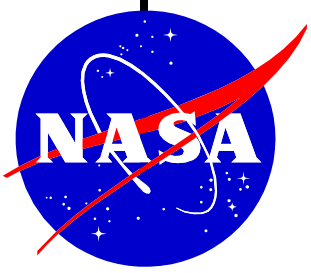
GAMMA-RAY LARGE AREA SPACE TELESCOPE (GLAST) PROJECT

GLAST MISSION OPREATIONS CENTER (MOC) AND OPERATIONS SUPORT SURVEILLANCE PLAN

June 2004



GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND

GAMMA-RAY LARGE AREA SPACE TELESCOPE
(GLAST)
PROJECT

GLAST MISSION OPERATIONS CENTER (MOC) and OPERATIONS SUPPORT SURVEILLANCE PLAN

June 2004

NASA Goddard Space Flight Center

Greenbelt, Maryland

GLAST MOC AND OPERATIONS SUPPORT SURVEILLANCE PLAN

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1 INTRODUCTION

1.1 Purpose

The purpose of this plan is to define the overall approach for surveillance of the contractor, Goldbelt Orca's activities on the Mission Operations Center and Operations Support contract/NAS5-TBD for the GLAST program. This plan defines the process the Government expects to follow to obtain data, evaluate the contractor, and determine if contractor performance is acceptable. The goal is to balance the level of Government surveillance with the perceived impacts and risks of poor quality support to the GSFC user community.

1.2 Scope

This plan identifies program requirements, strategies, and tactics to be used for program oversight. Surveillance activities are described, and the metrics and processes for a continuous measure of contract performance are defined. Identified are responsible individuals, specific areas to be placed under surveillance, planned frequency of surveillance, and associated metrics. This document is intended to be a "living" document from which resources and activities will evolve from one phase to another during the life of the contract. The plan will be updated as required.

The surveillance plan will address all elements of the contract, including quality assurance, and the implementation and operations phases of the GLAST program.

1.3 Guiding Directives

The guiding documents for this surveillance effort include:

Ground Data Systems MAR (433-MAR-0004)
GLAST MOC and Operation Support Statement of Work
GLAST Ground System Requirements Document
Performance Evaluation Plan
GLAST MOC Contract

2 SURVEILLANCE STRATEGY DEFINITIONS

2.1 Insight

Insight is an assurance process that uses product performance requirements and performance metrics to ensure process capability, product quality and end-item effectiveness. Insight relies on gathering a minimum set of product or process data that provides adequate visibility into the integrity of the product or process. The data may be acquired from contractor records, usually in a non-intrusive parallel method.

Insight as applied to this contract will result in lower levels of Government surveillance and allow the contractor to assume increased responsibility and accountability for the integrity of processes. Insight will rely heavily on evaluating planned contract deliverables and existing contractor procedures and working documents.

The Government's goal is to follow an insight-driven surveillance strategy. However, the Government reserves the right to use an oversight or hybrid approach (see below) to monitor questionable areas or areas of poor contractor performance.

2.2 Oversight

Oversight is an assurance process that uses customer-imposed product specification and process controls, such as MIL-Specifications, MIL Standards and mandatory inspections, to direct the development and production of the product. Oversight is intrusive in that it requires gathering contractor product or process data through on-site, in-series involvement in the process. Oversight entails very detailed monitoring of the process itself. Oversight is an in-line involvement in an activity, principally through inspection, with review and approval authority implicit to the degree necessary to assure that a process or product's key characteristics are stable and in control.

As applied to this contract, the Government will limit the use of oversight to those processes for which one or more of the following apply: 1) the Government assumes the liability; 2) the Government has determined that oversight is the only method to mitigate risk; 3) the contractor has limited experience and/or 4) the contractor has not demonstrated acceptable performance.

2.3 Hybrid

A hybrid surveillance approach combines elements of insight and oversight and may be instituted at a contractor's facility when a high level of confidence does not exist regarding the contractor's ability to identify, manage and control programmatic risks. This may occur when new technology is acquired or a contractor employs unproven processes. In this situation, oversight surveillance is used until sufficient data exist that demonstrate the contractor has all critical processes under control. The oversight activities usually impose mandatory Government inspection points in-series with the contractor's processes. Only after the contractor's demonstration of risk mitigation capabilities will NASA consider transitioning to insight activities that rely predominantly on internal contractor data. The transition period from oversight to insight activities is hybrid and accomplished incrementally, depending on contractor performance.

3 RESOURCES

3.1 General

All surveillance activities will be implemented using Government/support contractor personnel and resources at Goddard Space Flight and, if Defense Contract Management Command (DCMC) personnel are involved, at the Contractor's facility. The multi-disciplinary surveillance team will be composed of:

a. GLAST Program Office personnel

b. Contracting Officer

c. GLAST Ground System Manager

d. GLAST MOC COTR

e. GSFC Systems Assurance Manager (SAM)

f. GLAST Software Quality Assurance Representative

g. Administrative Contracting Officer (ACO)

4 MANAGEMENT REVIEW AND CONTROL PROCESSES

The following management review processes are used to formulate policy and to guide and direct surveillance activities:

Monthly Reports/Weekly Reports
Quarterly Management Reviews
Financial Reports (NF533)
Health and Safety Reports
Technical Reports
Monthly Status Reviews

5 SURVEILLANCE STRATEGY AND APPROACH

In general, the GLAST surveillance plan will take four primary forms:

1. Formal participation in various working groups, reviews, surveys, audits, technical interchange meetings and inspections.
2. Informal discussions, teleconferences, reviews, and meetings between GSFC, contractor and partners personnel
3. Review of metrics
4. Mandatory inspection of contractor work

The GLAST project will employ both the "insight" and "oversight" concepts of management and surveillance. The GLAST project will have visibility into the contractor technical progress and issues and will have full insight into program schedules at all levels.

Monthly Status Reviews, technical progress interchanges, and meetings of working groups are planned. These activities will be conducted as face-to-face meetings, videoconferences or teleconferences, as appropriate. Visibility gained through this formal and informal participation in the contractor and partners GLAST activities will be used as a primary means of collecting information to measure contract performance.

6 SELECTED SURVEILLANCE ACTIVITIES

Various Surveillance Team members will perform the following selected activities during applicable stages of contract performance:

6.1 Project Planning and Management

The contractor is responsible for managing the technical work specified in the SOW and the MOC contract.

Surveillance Team technical and business members will review schedules, resource plans and Risk Management Plans to obtain insight into the planning and execution of Statement Of Work. If the contractor consistently fails to meet performance metrics, either over a period of time or due to severe technical issues, the Surveillance Team may adopt an oversight surveillance approach until the problems are effectively addressed.

6.2 Reviews

Active participation by Surveillance Team members in the various subsystem and system reviews will be an integral part of the surveillance process. These reviews provide an opportunity to assess segments of the entire program and provide inputs on current status, accomplishments, and failures to date. Cognizant unit and subsystem managers and engineers will interface with designated contractor managers and review closure actions for acceptability. Team members will be the focal point for tracking open action items, and for collecting formal closures. Formal reviews will be conducted in accordance with contract/delivery order requirements.

6.3 Configuration Control

The contractor is responsible for managing configuration control in accordance with their Configuration Management Plan (MA-04). The Plan applies to all hardware and software related to any ground support or test equipment used. Changes affecting contract requirements must be submitted to Goddard Space Flight Center for approval.

6.4 Audits

The contractor may conduct internal audits using its Quality Assurance or other independent organization(s) in accordance with contractor standard practices and policies. Surveillance Team members may concurrently participate in contractor-led audits involving any aspect associated with this contract.

When the Government has concerns regarding contractor performance, Surveillance Team members may conduct independent audits of the contractor's activities, processes, products, documentation and data in order to provide assurance that the program is being implemented according to all requirements and specifications. These audits will normally be conducted with advance notification and coordinated with the contractor. However, the Government reserves the right to conduct unscheduled audits when evidence indicates that contractor performance is deficient.

Audits will be conducted in accordance with the contractor standard practices and policies. GSFC audit participants may generate an independent opinion, which will be provided in writing to the contractor and the project SAM. The contractor or partner will

submit audit reports to the resident Quality Engineer, who will summarize relevant information concerning audits to the project SAM on a monthly basis.

6.5 Safety

The implementation of safety engineering guidelines is the responsibility of the contractor system safety program as documented in their Systems Assurance Plan, 1196 EP-Q45016-000 and revisions, the System Safety Program Plan (SSPP) and Ground Operations Plan (GOP).

The primary responsibility for monitoring safety issues and documentation for GSFC is assigned to the GLAST Project Safety Manager (PSM) and his contract support. The surveillance team will interface with the cognizant GLAST project engineers and other GSFC organizations as required. The surveillance team will work with Goldbelt Orca representatives to ensure all safety requirements are fulfilled and any non-compliances are successfully resolved prior to launch.

7 DATA AND METRICS

Surveillance Team members will be responsible for collecting production, integration, test and product assurance data, and for facilitating overall surveillance activities. They will ensure that acceptable limits, data ranges, pass/failure criteria and goals have been established. Sources of data include the contractor, Goddard Space Flight Center, major subcontractors and suppliers. The majority of data will be readily available through established data documentation processes, including contract deliverables, contractor self-assessment programs and Government monitoring. Direct access to contractor data, through electronic means, may also be required. FAR 42.1104 states the Government shall make maximum use of any reliable contractor data. Therefore, prior to using contractor data, the Government must determine that the data is reliable by some validation process. A typical validation includes the following: 1) A periodic audit to verify the data collection and reporting systems have adequate processes to reliably produce accurate data and metrics; 2) Data sampling to validate data stored accurately reflects reality; and 3) Verification that the metric formulation (i.e., transformation of raw data into graphical elements) captures all data, uses appropriate transformations and displays it accurately.

Below are potential performance metrics that ~~may~~**will** be monitored by the Surveillance Team.

7.1 7.1 Problems/Concerns/Issues

- Statement of Problem/Concern/Issue
- Programmatic impact (cost, schedule, scope changes/impacts)
- Root cause identified
- Action taken
- Date established
- Current status
- Date resolved/closed

7.2 Costs

- Actual vs. planned
- Percent completed under budget
- Cost to complete

7.3 Milestone Schedule

- Milestone elements
- Actual vs. planned completion dates
- Percent completed early/on-time/late
- Quality
- Completeness (risks addressed)

7.4 Software Development

Software metrics will be periodically collected by the contractor and sent to required NASA GSFC personnel to be analyzed and interpreted. Metrics that will be evaluated include

- Element
- Date start/finish (actual vs. planned)
- Percent completed early/on-time/late
- Major delays/problems/concerns
- Open defects
- Closed defects
- Defects remaining open for more than 60 days
- Number of open high severity defects
- Number of requirements vs. the number of original requirements
- Percentage of requirements yet to be satisfied through testing

7.5 Contract Deliverables

- Percent completed early/on-time/late
- Percent approved/rejected
- Percent requirements satisfied

7.6 Resources

- Staff loading (actual vs. planned)
- Variances in Full Time Equivalents (FTE) over/under plan
- Skill mix (all disciplines covered/not covered)
- Workforce health indicator (percent of leave used by type and month)

7.7 Subcontractors

- Survey results
- Source inspection results
- Audit results
- Delivery schedule (late/early)
- Other assessments
- Concerns/Issues/Problems

7.8 Audit Results

- Number of findings by category
- Trending data - time from finding to closure
- Trending data - open vs. closed audit reports
- Trending data - corrective action closeouts
- Trending data on open action items - 30, 60, 90 days

8 LIST OF ACRONYMS

ARB	Alert Review Board
CAB	Corrective Action Board
CCB	Configuration Control Board
CDR	Critical Design Review
DCMC	Defense Contract Management Command
DPM	Deputy Project Manager
EEE	Electrical, Electronic, and Electromechanical
FOR	Flight Operations Review
FRB	Failure Review Board
FRR	Flight Readiness Review
GBM	GLAST Burst Monitor
GLAST	Gamma-Ray Large Area Space Telescope
GOP	Ground Operations Plan
GPO	GLAST Project Office
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
LRR	Launch Readiness Review
MAE	Materials Assurance Engineer
MEB	Materials Engineering Branch
MOR	Mission Operations Review
MRB	Material Review Board
MSFC	Marshall Space Flight Center
MSPSP	Missile System Pre launch Safety Package
MUA	Material Usage Agreement
NAR	Non-Advocate Review
NCS	Nonconformance Control System
NRL	Naval Research Laboratories
ORR	Operational Readiness Review
PA	Product Assurance
PDR	Preliminary Design Review
PER	Pre-environmental Review
PIL	Parts Identification List
PMP	Parts, Materials and Processes
PMPCB	Parts, Materials and Processes Control Board
PRA	Probabilistic Risk Assessment
PPE	Project Parts Engineer
PSM	Project Safety Manager
PSR	Pre-shipment Review
QA	Quality Assurance
QAM	Quality Assurance Management
QAR	Quality Assurance Representative
QE	Quality Engineer
RFA	Request for Action
RQE	Resident Quality Engineer
RSE	Resident Systems Engineer
SAM	Systems Assurance Manager
SLAC	Stanford Linear Accelerator Center
SQA	Software Quality Assurance
SSPP	System Safety Program Plan
TIM	Technical Interchange Meeting

9 LIST OF DEFINITIONS

The following definitions apply within the context of this document:

Audit: A review of the developers, contractor's or subcontractor's documentation or hardware to verify that it complies with project requirements.

Configuration: The functional and physical characteristics of the payload and all its integral parts, assemblies and systems that are capable of fulfilling the fit, form and functional requirements defined by performance specifications and engineering drawings.

Configuration Control: The systematic evaluation, coordination, and formal approval/disapproval of proposed changes and implementation of all approved changes to the design and production of an item the configuration of which has been formally approved by the contractor or by the purchaser, or both.

Configuration Management: The systematic control and evaluation of all changes to baseline documentation and subsequent changes to that documentation which define the original scope of effort to be accomplished (contract and reference documentation) and the systematic control, identification, status accounting and verification of all configuration items.

Designated Representative: An individual (such as a NASA plant representative), firm (such as assessment contractor), Department of Defense (DOD) plant representative, or other government representative designated and authorized by NASA to perform a specific function for NASA. As related to the contractor's effort, this may include evaluation, assessment, design review, participation, and review/approval of certain documents or actions.

Discrepancy: See Nonconformance

Failure: A departure from specification that is discovered in the functioning or operation of the hardware or software. See nonconformance.

Failure Modes and Effects Analysis (FMEA): A procedure by which each credible failure mode of each item from a low indenture level to the highest is analyzed to determine the effects on the system and to classify each potential failure mode in accordance with the severity of its effect.

Insight: Insight is an assurance process that uses product performance requirements and performance metrics to ensure process capability, product quality, and end-item effectiveness. Insight relies on gathering a minimum set of product or process data that provides adequate visibility into the integrity of the product or process. The data may be acquired from contractor records or report deliverables, usually in a non-intrusive parallel method.
Insight as applied to contract will result in lower levels of GSFC surveillance and allow the contractor to assume increased responsibility and accountability for the integrity of processes. GSFC goal is to follow an insight-driven surveillance strategy. However, GSFC reserves the right to use an oversight approach to monitor questionable areas or areas of poor contractor / partner performance.

Inspection: The process of measuring, examining, gauging, or otherwise comparing an article or service with specified requirements.

Instrument: A spacecraft subsystem consisting of sensors and associated hardware for performing measurements or observations in space. For the purposes of this document, the referenced instrument is the LAT.

Observatory: See Spacecraft.

Oversight: Oversight is an assurance process that uses customer-imposed product specification and process controls, such as MIL-specifications, commercial specification, performance specifications and mandatory inspections, to direct the development and production of the product. Oversight is intrusive in that it requires gathering contractor/partner product or process data through on-site, in-series involvement in the process. Oversight entails very detailed monitoring of the process itself. Oversight is an in-line involvement in an activity, principally through inspection, with review and approval authority implicit to the degree necessary to assure that a process or product's key characteristics are stable and in control. GSFC inspection points will be determined primarily by SAM, Project Manager/COTR requirements for progress reviews or as otherwise specified.

Payload: See Spacecraft. "Payload," “Observatory,” and/or "spacecraft" are sometimes used interchangeably.

Spacecraft: An integrated assemblage of modules, subsystems, etc., designed to perform a specified mission in space. Other terms used to designate this level of assembly are Laboratory, Observatory, and Satellite.

Monitor: To keep track of the progress of a performance assurance activity; the monitor need not be present at the scene during the entire course of the activity, but he will review resulting data or other associated documentation (see Witness).

Nonconformance: A condition of any hardware, software, material, or service in which one or more characteristics do not conform to requirements. As applied in quality assurance, non-conformances fall into two categories--discrepancies and failures. A discrepancy is a departure from specification that is detected during inspection or process control testing, etc., while the hardware or software is not functioning or operating. A failure is a departure from specification that is discovered in the functioning or operation of the hardware or software.

Repair: A corrective maintenance action performed as a result of a failure so as to restore an item to operate within specified limits.

Rework: Return for completion of operations (complete to drawing). The article is to be reprocessed to conform to the original specifications or drawings.

Witness: A personal, on-the-scene observation of a performance assurance activity with the purpose of verifying compliance with project requirements (see Monitor).